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SUMMARY REPORT FOR THE CONFERENCE ON POLLUTION OF RARITAN BAY AND ADJACENT INTERSTATE WATERS. THIRD SESSION

Federal Water Pollution Control Administration
Metuchen, New Jersey

May 1967

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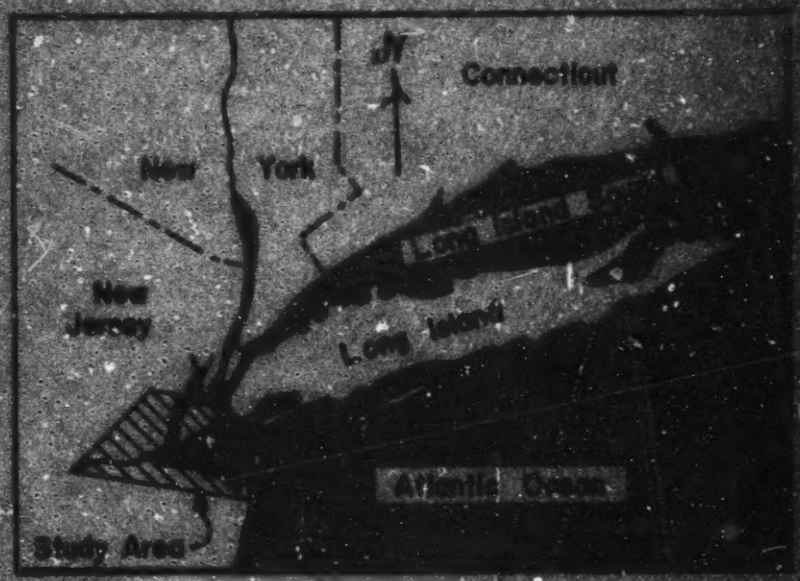
for

THE CONFERENCE ON POLLUTION OF RARITAN BAY AND ADJACENT INTERSTATE WATERS

THIRD SESSION



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U.S. DEPARTMENT OF THE INTERIOR
FEDERAL WATER POLLUTION CONTROL ADMINISTRATION
NORTHEAST REGION - RARITAN BAY PROJECT
METUCHEN, N.J.
MAY 1967

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CONCLUSIONS

1. Raritan Bay and Arthur Kill are interstate waters within the meaning of 33 USC 466 et seq. Raritan River, a major tributary, is included in the conference area because of its effects on the Bay. Pollution results from the direct discharge of municipal and industrial wastes, as well as by wastes carried into the area from Upper Bay. Originating in the States of New York and New Jersey, this pollution endangers the health and welfare of persons living in both states and is subject to abatement under 33 USC 466 et seq.

2. The primary cause of pollution of the eastern section of Raritan Bay is the transfer of untreated and inadequately treated wastes from Upper Bay through the Narrows. Recommendations by the "Conference In the Matter of Pollution of the Interstate Waters of the Hudson River and Its Tributaries--New York and New Jersey" pertain to these waste sources.

3. The major cause of pollution of the western section ~~of Raritan Bay~~ is the direct discharge of raw and inadequately treated municipal wastes.

4. Additional pollution in the western section results from the interchange of these waters with the polluted Raritan River and Arthur Kill.

5. Arthur Kill is polluted by the discharge of raw or inadequately treated industrial and municipal wastes. Limited circulation in this waterway results in grossly polluted conditions.

6. Many existing municipal wastes treatment facilities are outdated, overloaded or inadequately maintained. Poor operation by unlicensed and untrained personnel adds to the problem. The State of New Jersey and the City of New York, in cooperation with the Interstate Sanitation Commission, have placed the major polluters under formal abatement orders.

7. New York, New Jersey and the Interstate Sanitation Commission have classified the waters of the study area. While these classifications, which are based on best use of the waters, may not agree in all cases there seems to be no reason why the highest water quality proposed by any one of the three agencies should not be adopted by all. Selection of the highest criteria would provide for the safe use of the Arthur Kill for recreational boating.

8. Plans or construction are underway for improved wastes treatment facilities for a number of sources in ~~both states~~.

9. Commercial boating is not at present a serious source of pollution in the open waters, but may present local problems in berthing areas.

10. Pleasure boating, although a major water use affected by pollution of the Raritan Bay, is also a measurable contributor to pollution.

11. Major benefits will accrue in recreational bathing from the clean up of these waters.

12. Additional major benefits would accrue if the quality of these waters were at the level necessary to support a safe shellfishery.

RECOMMENDATIONS

On the basis of Project studies the following recommendations are made in order to reclaim study area waters for maximum beneficial uses:

1. Treatment facilities provide a minimum of 90% removal of BOD and suspended solids, and effective year round disinfection (effluent coliform count of no greater than one per ml in more than 10% of samples examined) at all municipal plants discharging directly to these waters. Program to be carried out in accordance with following time schedule:

a. Complete plant design no later than December 1, 1967;

b. Initiate construction no later than June 1, 1968;

c. Place in operation no later than June 1, 1970;

unless existing orders specify completion dates earlier than the above, in which case the earlier dates must be met.

2. Industrial plants shall improve practices for the segregation and treatment of wastes so as to effect maximum reduction of the following:

a. Acids and alkalis

b. Oil and tarry substances

c. Phenolic and other compounds that contribute to taste, odor and tainting of fin and shellfish meat.

d. Nutrient materials, including nitrogenous and phosphorous compounds

e. Suspended material

f. Toxic and highly colored wastes

g. Oxygen requiring substances

h. Heat

i. Foam producing discharges

j. Bacteria

k. Wastes which detract from optimum use and enjoyment of receiving waters.

Industrial treatment facilities to accomplish such reduction must provide removals at least the equivalent of those required for municipal treatment plants. Such facilities or reduction should be provided in accordance with the following time schedule:

a. Completion of engineering studies and design by December 1, 1967;

b. Commence construction by June 1, 1968;

c. Place in operation by June 1, 1970;

unless existing orders specify compliance dates earlier than the above, in which case the earlier dates must be met.

3. Qualified resident operators (licensed or certified) be provided at each treatment plant.

4. Facilities and procedures be established at each treatment facility to provide laboratory control.

5. Automatic instrumentation and recorders be required for flow and chlorination feed or residual control to permit prompt and effective supervision by plant operators and water pollution control agencies.

6. Priority for construction grants be established so affected communities may obtain funds to meet the requirements outlined above.

7. Recognition be given to the problems which will arise as a result of the continued population growth in the area, which may lead to the necessity for tertiary or other advanced wastes treatment techniques. All new facilities should be planned with sufficient site space to permit future expansion for such treatment.

8. State regulations be extended to require wastes treatment facilities or holding tanks on all vessels and recreational boats using the area. If holding tanks are to be used, adequate dockside facilities be required to ensure proper disposal of wastes.

9. Conferees meet every six months to review and initiate progress on water quality improvements.

10. Conferees will investigate additional proposals to safeguard water quality in the study area, to include but not be limited to:

a. Relocation of the main shipping channel through Raritan Bay to improve circulation characteristics;

b. Selection of areas for dredging for construction materials;

c. Suitable outfall locations for waste effluents to include possible trunk systems to divert effluents from the Arthur Kill.

INTRODUCTION

The Federal Water Pollution Control Act, as amended (33 USC 466 et seq) provides that pollution of interstate waters which endangers the health or welfare of any person is subject to abatement under procedures described in Section 10 (33 USC 466g) of the Act.

On the basis of reports, surveys and studies the Surgeon General of the Public Health Service, having reason to believe that pollution of the interstate waters of Raritan Bay and adjacent waters was endangering the health and welfare of persons in the States of New York and New Jersey, called a conference on the pollution of these waters. At the first session in August 1961, conferees requested a study by the Public Health Service to obtain scientific data for further control of pollution. Accordingly, the Raritan Bay Project was established to carry out such a program. A second session of the conference was held in May 1963. At that time the Project reviewed its activities through December 1962 and was requested by the conferees to continue its studies to completion. On January 1, 1966, Congress transferred water pollution control activities from the Public Health Service to the Federal Water Pollution Control Administration. In May 1966, a Presidential reorganization transferred the Administration to the Department of the Interior, which has continued the Raritan Bay Project.

The project study area, shown in Figures 1 and 2, includes Raritan, Lower and Sandy Hook Bays--collectively referred to in this report as Raritan Bay, the Arthur Kill, and the Raritan River from its mouth to the confluence of the Millstone River in Manville, N. J. In addition, the Project carried out investigations in Upper Bay since pollution of that water was found to be a contributing factor to the water quality in the study area.

The 1965 population in the five counties immediately adjacent to Raritan Bay was 2.2 million persons. Projections indicate that by 1985 it will increase to 4.3 million, plus an additional 1.0 million persons in western Brooklyn, N. Y. Hence, more than 5.0 million people will be conveniently located adjacent to, or in close proximity to the study area.

Waters of the study area are presently utilized for industrial water supply, navigation, commercial fin and shellfishing, and a variety of recreational activities. However, full utilization of these waters is presently restricted by unsuitable water quality. The present estimated annual value of water use is $2.0 million; 90% of which is associated with recreation. With suitable quality, future potential value of these waters could be at least $19.0 million annually.

Studies of water currents and dispersion patterns indicate that Raritan Bay is affected by materials discharged into waters outside the immediate limits of the Project study area. Hence, any control program must consider the study area as a part of a system which includes Upper Bay, Kill Van Kull and Newark Bay.

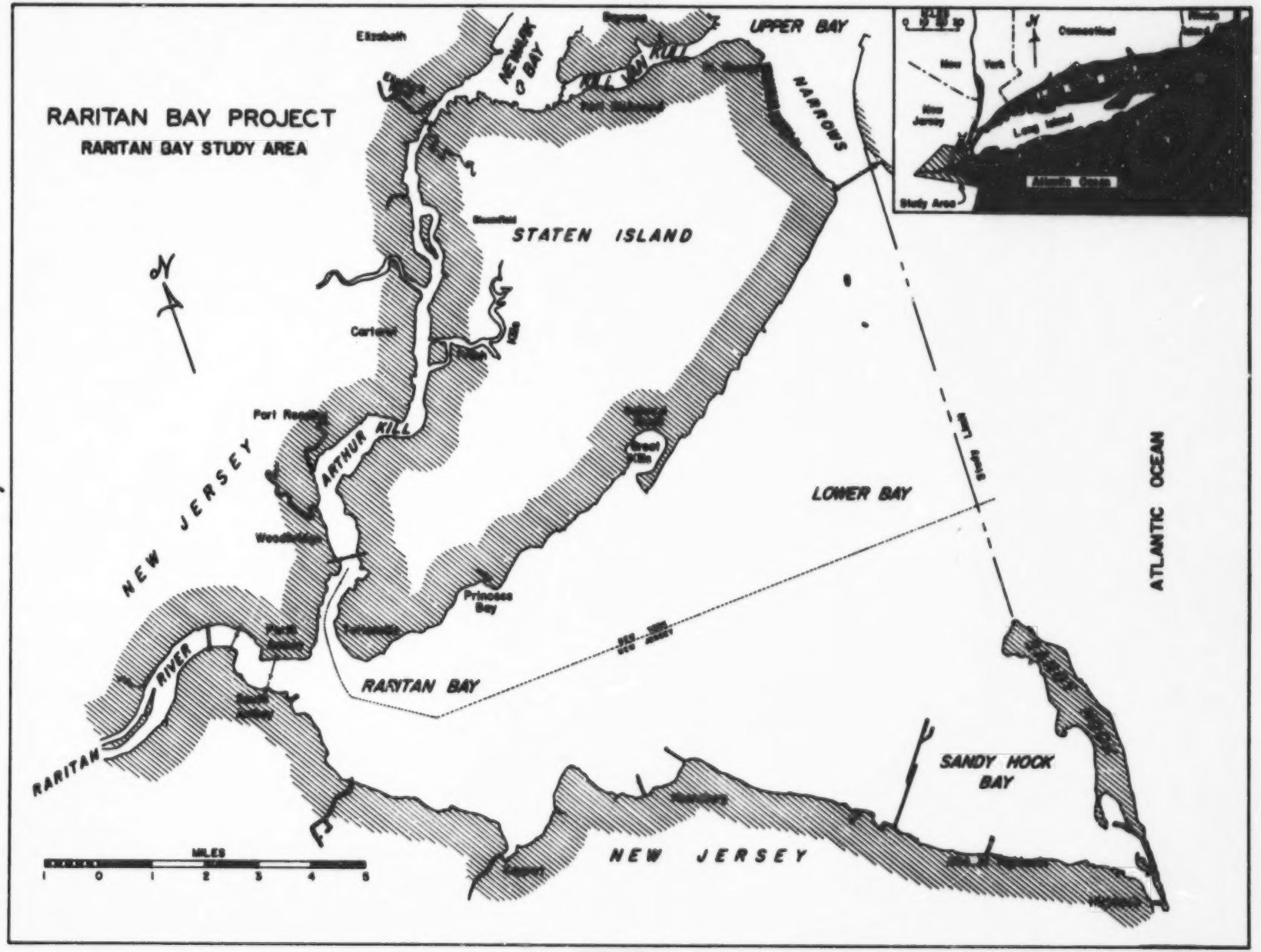

FIGURE 1

GPO 955-949

FIGURE 2

GPO 955-949

WASTE DISCHARGES

RARITAN BAY

Municipal

Raritan Bay presently receives the discharge of treated and untreated municipal wastes from more than 500,000 persons. Untreated wastes from 3,000 people are discharged from Tottenville, Staten Island, N. Y. More than 80% of the remaining population is served only by primary treatment plants. Adequate disinfection of these wastes is not provided at all times due to inadequate maintenance and operation. Sources of municipal and institutional wastes, shown in Figure 3, are as follows:

No Treatment

Tottenville, Staten Island, N. Y.

Primary Treatment

Highlands, N. J. (887)

Atlantic Highlands, N. J. (884)

Keansburg, N. J. (878)

Keyport, N. J. (875)

Matawan Borough, N. J. (869)

Madison Township, N. J. (866)

Sayreville - Morgan, Sayreville, N.J. (863)

South Amboy, N. J. (860)

Middlesex County Sewerage Auth., Sayreville, N. J. (854)

Perth Amboy, N. J. (842)

Mount Loretto Home, Princess Bay, Staten Island, N. Y. (818)

Richmond Memorial Hosp. Princess Bay, Staten Island, N. Y. (812)

Daytop Lodge, Princess Bay, Staten Island, N. Y. (880)

Intermediate Treatment

St. Joseph's by the Sea, Huguenot, Staten Island, N. Y. (806)

Secondary Treatment

Matawan Township, N. J. (872)

Matawan Township #3, Cliffwood Beach, N. J. (877)

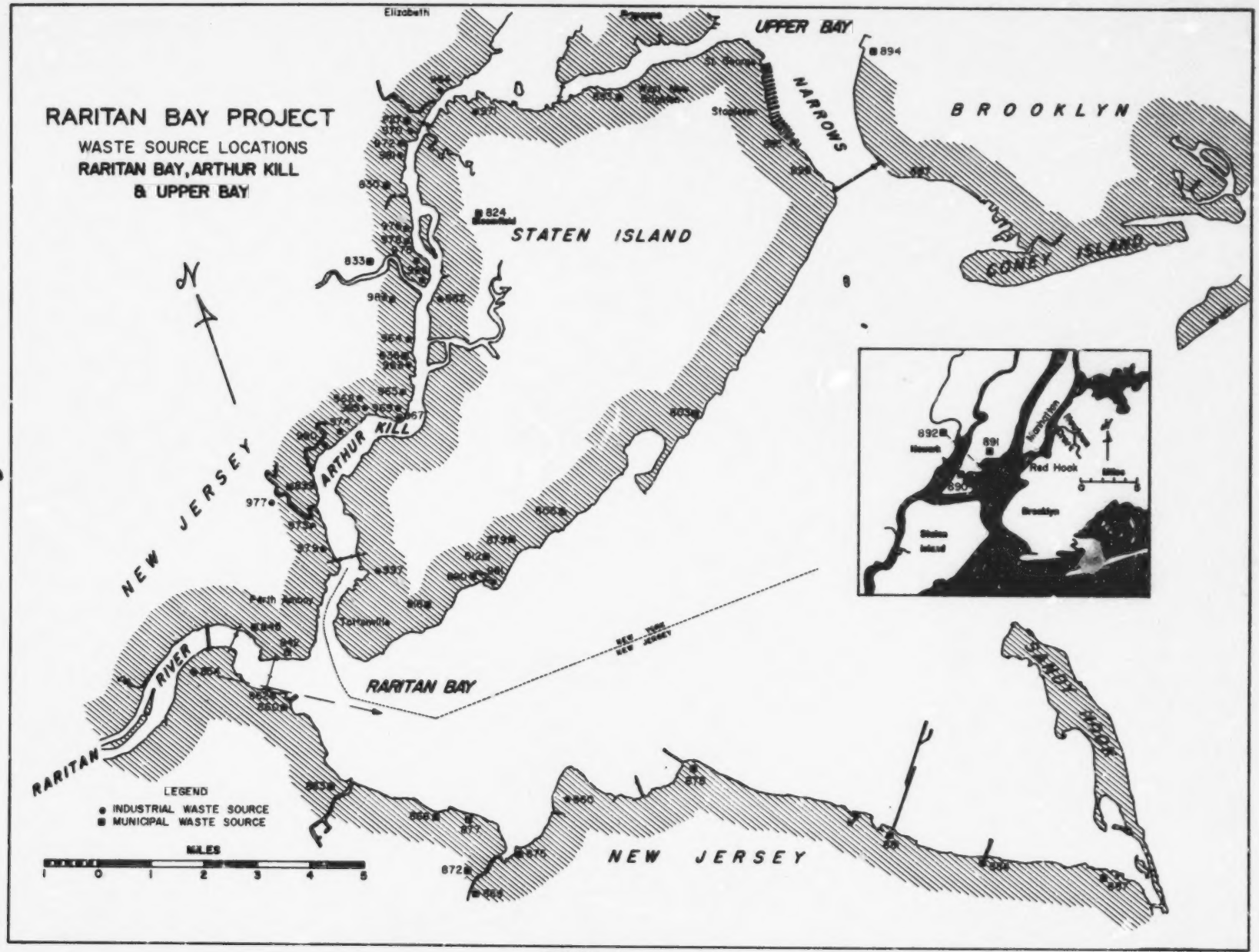

FIGURE 3

GPO 955-940

Junior High School #7, Huguenot, Staten Island, N. Y. (879)

Oakwood Beach, Staten Island, N. Y. (803)

These raw and treated sources represent an average flow of 72 MGD and loadings of 182,000 lbs/day of BOD and 40,000 lbs/day of suspended solids to Raritan Bay. More than 90% of the BOD load is from one source - Middlesex County Sewerage Authority.

Industrial

Industrial wastes emanate from three sources. (See Figure 3). International Flavors and Fragrances, Inc., Union Beach, N. J. (960), discharges on an intermittent basis 2,500 lbs/day of BOD. The S. S. White Co., Princess Bay, Staten Island, N. Y. (961), discharges wastes containing 2.0 lbs/day of chromium and less than 1.0 lb/day of cyanide. The South Amboy Power and Light Co., South Amboy, N. J. (962), uses 100 MGD of Bay water, returning it with an average temperature increase of 10°F, which represents a daily heat load of 80 billion BTU's.

Federal Installations

The only installation discharging is Leonardo Naval Depot, Leonardo, N. J. (881). This facility, handling wastes from 75 people, is served by an intermediate treatment plant. Loading is estimated at less than 1.0 lb/day of BOD. At the dock loading area chemical toilets have replaced privies serving crew members and laborers of dockside vessels.

Total Loadings

The waters receive 185,000 lbs/day of BOD. Although the tributary population is only 500,000, this loading is equivalent to the discharge of raw sewage from 1,084,000 people. This loading is due to high volumes of industrial wastes discharged to many of the municipal plants, in particular, Middlesex County Sewerage Authority.

ARTHUR KILL

Municipal

The Arthur Kill receives the discharge of treated and untreated municipal wastes from more than 831,000 persons. Untreated wastes emanate from the Bayway and Singer areas of Elizabeth, N. J. Sewage is provided primary treatment only, with chlorination practiced at only two of the five municipal plants in New Jersey.

Sources of municipal and institutional wastes (See Figure 3) are as follows:

No Treatment

Elizabeth, N. J.

Primary Treatment

Woodbridge - Sewaren, N. J. (839)

Carteret, N. J. (836)

Rahway Valley, Rahway, N. J. (833)

Joint Meeting, Elizabeth, N. J. (827)

Linden - Roselle, Linden, N. J. (830)

Willowbrook State School, Staten Island, N. Y. (824)

These seven sources represent an average flow of nearly 82 MGD, and discharge more than 138,000 lbs/day of BOD and 55,000 lbs/day of suspended solids.

Industrial

Untreated or partially treated wastes from 21 industries and three power generating stations are discharged to the Kill (See Figure 3). The listing which follows identifies sources and extent of treatment provided. Many industries provide some treatment to at least a portion of their wastes, or discharge at least partially to municipal systems; therefore, such industries are classified as providing partial treatment.

No Treatment

American Agricultural Co., Carteret, N. J. (963)

FMC Corp., Carteret, N. J. (964)

Reichhold Chemicals, Inc., Carteret, N. J. (965)

American Cyanamid Co., Linden, N. J. (966)

Armour Agricultural Chemical Co., Carteret, N. J. (967)

Sinclair - Koppers Company, Inc., Port Reading, N. J. (968)

U. S. Metals Refining Co., Carteret, N. J. (969)

Phelps Dodge Copper Products Corp., Elizabeth, N. J. (970)

Procter and Gamble Manufacturing Co., Port Ivory, S. I., N. Y. (971)

Nassau Smelting and Refining Co., Inc., Tottenville, S. I., N. Y. (997)

Partial Treatment

Humble Oil and Refining Co., Linden, N. J. (972)

Chevron Oil Co., Perth Amboy, N. J. (973)

Hess Oil and Chemical Co., Port Reading, N. J. (974)

Citgo Oil Co., Linden, N. J. (975)

E. I. DuPont de Nemours and Co., Grasselli, Linden, N. J. (976)

American Cyanamid Co., Woodbridge, N. J. (977)

General Aniline and Film Corp., Linden, N. J. (978)

American Smelting and Refining Co., Perth Amboy, N. J. (979)

Public Service Generating Station, Sewaren, N. J. (980)

Public Service Generating Station, Linden, N. J. (981)

Consolidated Edison Arthur Kill Generating Station, S. I., N. Y. (982)

General American Transportation Corp., Carteret, N. J. (983)

Archer Daniels Midland Co., Elizabeth, N. J. (984)

Koppers Company Inc., Forest Products Division, Port Reading, N. J. (985)

These industries, exclusive of the power generating stations, discharge a total of 300 MGD of wastes, imposing daily loadings of 100,000 pounds of BOD, 187,000 pounds of COD, 10 tons of oil and 5 tons of phenol. The three power stations use a total of 1,660 MGD of Arthur Kill water for cooling purposes and discharge daily 200 billion BTU's of heat.

Total Loadings

On a BOD basis, municipal and industrial wastes discharged are equivalent to the untreated sewage from more than 1.4 million persons. The total loadings amount to more than 240,000 lbs/day of BOD and more than 440 MGD of wastes. Since chlorination is not required at most of these facilities, the discharge of human wastes without disinfection represents a large bacteriological contamination of the waters.

RARITAN RIVER

Municipal

The waters downstream of its juncture with the Millstone receive the discharge of treated municipal wastes from 20,000 persons. These sources, shown in Figure 4, are as follows:

Primary Treatment

Manville, N. J. (883)

Woodbridge - Keasby, Keasby, N. J. (845)

Sayreville - Melrose, Sayreville, N. J. (857)

Secondary Treatment

Helmetta, N. J. (885)

Jamesburg, N. J. (886)

East Brunswick Turnpike, East Brunswick, N. J. (888)

Raritan Depot, Edison, N. J. (848)

These sources amount to a flow of 2.0 MGD and impose loadings of 1,600 lbs/day of BOD and 800 lbs/day of suspended solids.

Industrial

Wastes are discharged from 10 industries and one power generating station. (See Figure 4). All provide some form of treatment or discharge a portion of their wastes to municipal systems. In a number of cases, wastes discharged without treatment are reported to be cooling waters only; however, analyses have shown contamination of these effluents.

Partial Treatment

Union Carbide Corp., Bound Brook, N. J. (986)

National Lead Co., South Amboy, N. J. (987)

American Cyanamid Co., Bound Brook, N. J. (988)

Hatco Chemical Division, W. R. Grace and Co., Fords, N. J. (989)

Tenneco Chemicals, Inc., Heyden Division, Fords, N. J. (990)

E. I. DuPont de Nemours and Co., Photo Products, Parlin, N. J. (991)

E. I. DuPont de Nemours and Co., Finishes Plant, Parlin, N. J. (992)

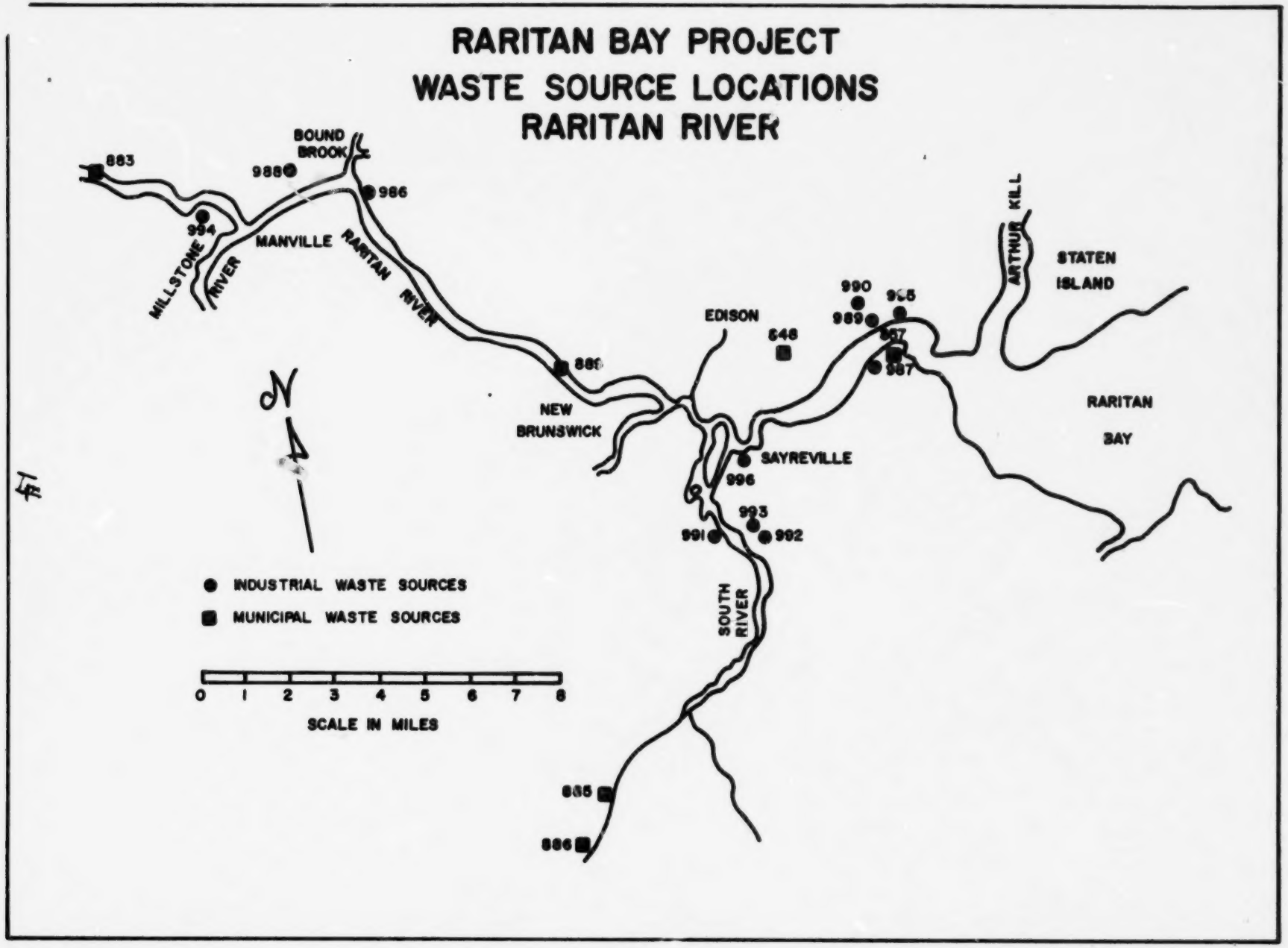

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FIGURE 4

Hercules Powder Co., Sayreville, N. J. (993)

Johns - Manville Products Corp., Manville, N. J. (994)

Philip Carey Manufacturing Co., Perth Amboy, N. J. (995)

Jersey Central Power and Light Co., Sayreville, N. J. (996)

These processing industries discharge more than 76 MGD of wastes, and impose loadings of nearly 70,000 lbs/day of BOD and more than 45,000 lbs/day of suspended solids. The power generating station returns 300 MGD of cooling water to the river, with a heat discharge of 250 billion BTU's.

Federal Installations

The only installation discharging is Camp Kilmer. (889). Presently the site of a Job Corps Training Center operated for the Office of Economic Opportunity, it provides secondary treatment for wastes from 1,000 people. Flow averages 1.0 MGD and has a BOD loading of 25 lbs/day.

Total Loadings

On a BOD basis, municipal and industrial wastes discharged to the Raritan River are equivalent to the untreated sewage from 430,000 persons. Loadings from the 88 MGD flow amount to 71,000 lbs/day of BOD and 800 lbs/day of suspended solids. On both a flow and BOD basis, industry contributes 98% of the wastes discharged.

UPPER BAY

Municipal

The waters receive untreated wastes from an estimated 1.6 million persons, and treated wastes from 2.2 million persons. Sources are as follows:

No Treatment

Manhattan, N. Y.

Red Hook, Brooklyn, N. Y.

Staten Island (St. George, Stapleton and West New Brighton), N. Y.

Primary Treatment

Bayonne, N. J. (890)

Jersey City East, N. J. (891)

Passaic Valley Sewer Commission, N. J. (892)

Port Richmond, Staten Island, N. Y. (893)

Intermediate Treatment

Owl's Head, Brooklyn, N. Y. (894)

Wastes from these raw and treated sources total more than 900 MGD and impose a loading of more than 800,000 lbs/day of BOD and 640,000 lbs/day of suspended solids. Wastes from the treated sources are not disinfected prior to discharge.

Federal Installations

Installations discharging are as follows:

U. S. Public Health Service Hospital, Staten Island, N. Y. (895)

U. S. Public Health Service Quarantine Station, Staten Island, N. Y. (896)

Fort Hamilton, Brooklyn, N. Y. (897)

Major portion of these wastes are discharged to New York City's sewer system.

AREA WIDE DISCHARGES

Boating

Waters of the study area receive wastes from commercial vessels and recreational boats. Pollution from commercial vessels, generally concentrated in berthing areas, was estimated equivalent to 600 persons. It is estimated that recreational boats contribute 725 lbs/day of BOD and a bacterial loading equivalent to the raw discharge from nearly 6,000 persons.

Combined Sewers

Combined sewer systems with stormwater overflows which discharge into Raritan Bay or immediately adjacent waters include those of Perth Amboy, N. J.; Tottenville, Staten Island, N. Y.; northeasterly Staten Island, N. Y.; and the Red Hook section of Brooklyn, N. Y.

Overflow from the Perth Amoby system during a summer storm was estimated at 22 MGD, with a BOD loading at 7,000 lbs/day. Contamination by bacteria as a result of such overflows constitutes a health hazard to users of these waters.

No estimates were made for other systems, as they presently discharge raw sewage under dry weather conditions. Until such time as raw sewage discharges are abated, no measurements can be made of the effects of such overflows since they cannot be distinguished from normal dry weather discharges.

EFFECTS ON WATER QUALITY

Raritan Bay

Discharge of wastes to Raritan Bay results in a degradation of water quality. Movement of municipal wastes from Upper Bay through the Narrows results in bacteria densities on the bathing areas of Staten Island, N. Y., in excess of the established limits for bathing. Salmonella organisms were isolated from swimming areas on Staten Island. The presence of pathogenic bacteria directly imply a health hazard and attest to the degraded water quality.

Shellfish taken from the Bay indicated high bacterial counts and the presence of Salmonella organisms. Hence, a health hazard exists when these shellfish are consumed raw or inadequately cooked. Virtually all of the productive shellfish harvest areas in the study waters have been closed by action of the States of New York and New Jersey. The discharge of industrial wastes results in tainting of shellfish meats by phenols and mineral oils, so as to render them unsuitable for market.

Arthur Kill

As a result of the discharges previously described, water quality in the Arthur Kill is degraded. The imposed oxygen demand exceeds the assimilative capacity of the tidal strait so that dissolved oxygen was absent. In the reach from the Elizabeth River to Newark Bay dissolved oxygen was often zero. At some stations the Kill was found to be devoid of benthic organisms due to the absence of adequate dissolved oxygen levels, together with the presence of oil deposits and toxic materials which created an environment unsuitable for aquatic life.

Raritan River

As a result of waste discharges these waters undergo extreme degradation. At times, in the upper reaches, dissolved oxygen was zero, resulting in septic conditions and the formation of objectionable gases. In the past the waterway was used for bathing and fishing; however, loads now imposed prevent its utilization for recreational purposes. In addition, these wastes are transported into the western end of Raritan Bay, acting as an additional source of pollution to that water.

POLLUTION ABATEMENT PROGRESS

Abatement Orders

The New Jersey State Department of Health has issued formal abatement orders against the following sources of pollution, requiring them to cease and desist pollution and come forward with plans for abatement:

Source	Date Ordered	Required Compliance Date
Hatco Chemical Div., W.R. Grace and Co.	Dec. 21, 1962	Apr. 15, 1963
Union Carbide Corp.	July 14, 1942	None
Stabilized Pigments	Dec. 21, 1962	Apr. 15, 1963
General Aniline and Film Corp.	Jan. 22, 1963	Jan. 27, 1964
American Cyanamid Co., Linden	Jan. 22, 1963	Jan. 27, 1964
Reichhold Chemicals, Inc., Elizabeth	Jan. 23, 1963	Jan. 7, 1965
Humble Oil and Refining Co.	Jan. 22, 1963	Jan. 27, 1964
Philip Carey Manufacturing Co.	Sept. 1, 1961	Dec. 1, 1961
Hess Oil and Chemical Co.	Aug. 26, 1964	Dec. 15, 1964
Borough of Highlands	Dec. 11, 1964	April 1, 1965
Linden - Roselle Sewerage District	Jan. 22, 1963	Jan. 27, 1964
Woodbridge - Sewaren	Jan. 22, 1963	Jan. 27, 1964
Rahway Valley Sewerage Authority	Jan. 22, 1963	Jan. 27, 1964
Joint Meeting	-	-
Carteret	Consent judgment to be issued	

According to the Department of Health, by early March 1967 the following corrective measures had been taken:

Source	Action
Hatco Chemical Div., W.R. Grace and Co.	Connected to Middlesex County Sewerage Authority, Nov., 1966
Union Carbide Corp.	With exception of cooling water, connected to Middlesex County Sewerage Authority

Reichhold Chemicals, Inc.	Connected to municipal sewer, January, 1966
Humble Oil and Refining Co.	Treatment facilities constructed for several areas of plant

In early 1966, the New Jersey Department of Health classified the waters of Raritan Bay and Raritan River and issued orders requiring construction of secondary treatment facilities as follows:

Agency	Date Issued	Compliance Date
American Cyanamid Co., Bound Brook	2-18-1966	6-1-1966
Johns-Manville Products Corp.	2-18-1966	6-1-1966
Middlesex County Sewerage Authority	2-18-1966	6-1-1966
Borough of Manville	2-18-1966	6-1-1966
Perth Amboy	2-18-1966	6-1-1966
Borough of Sayreville	2-18-1966	6-1-1966
South Amboy	2-18-1966	6-1-1966
Woodbridge Township	2-18-1966	6-1-1966
Madison Township Sewerage Authority	4-7-1966	8-15-1966
Borough of Keyport	4-7-1966	8-15-1966
Borough of Keansburg	4-7-1966	8-15-1966
Borough of Atlantic Highlands	4-7-1966	8-15-1966
Borough of Matawan	4-7-1966	8-15-1966
Matawan Twp. Mun. Ut. Authority (2 plants)	4-7-1966	8-15-1966

According to the Health Department, as of early 1967 virtually all of the above were making satisfactory progress, either in developing plans to upgrade existing facilities or in conducting studies to develop regional sewerage authorities or facilities. To date, these orders have not met compliance.

The New York City Department of Health has issued orders against the following pollution sources in Staten Island:

	Date Ordered	Compliance Date	Remarks
Mount Loretto Home	March 27, 1962	April, 1964	Complied
St. Josephs by the Sea	March 27, 1962	-	Complied
Richmond Memorial Hospital	March 15, 1962	Sept., 1964	Complied
Nassau Smelting and Refining Co., Inc.	March 27, 1962	May, 1969	To connect to city sewer by May, 1969
Procter and Gamble Manufacturing Co.	April 5, 1963	June, 1968	To connect to city sewer by June, 1968
S. S. White Co.	March 15, 1962	April, 1969	To connect to city sewer by April, 1969

In the case of the last three sources listed, the compliance date is based upon completion of new interceptor sewers and/or construction of treatment facilities by the City to handle these wastes.

The Interstate Sanitation Commission has one abatement order outstanding against the City of Elizabeth, N. J., requiring construction of interceptor sewers to eliminate the raw discharge now emanating from the Bayway and Singer areas. Plans are now underway for such construction.

Construction and Planning Programs (1962 to date)

Construction Completed

New treatment facilities have been constructed, or existing facilities enlarged at the following:

Keyport, N. J.
Keansburg, N. J.
Middlesex County Sewerage Authority, N. J.
Madison Township, N. J.
Newtown Creek, N. Y.

Construction Plans Underway or Complete

Madison Township, N. J. (Secondary)
Port Richmond, N. Y. (Interceptors)
Oakwood Beach, N. Y. (Expansion and Interceptors)
Elizabeth, N. J. (Interceptors)

Preliminary Planning Underway or Complete

Highlands, N. J.
Woodbridge-Sewaren, N. J.
Atlantic Highlands, N. J.
Red Hook, N. Y.
Monmouth County, N. J.
Keyport, N. J.
Keansburg, N. J.
Tottenville, N. Y.
Fresh Kills, N. Y.

Pilot Plant Studies Underway or Complete

The following have undertaken pilot plant studies to determine methods for providing increased treatment:

Middlesex County Sewerage Authority, N. J.
Linden-Roselle Sewerage District, N. J.
Rahway Valley Sewerage Authority, N. J.
Joint Meeting, N. J.

Classifications - Treatment Requirements

Waters under the jurisdiction of the Interstate Sanitation Commission and the State of New York Water Resources Commission have been classified. In 1964, the New Jersey State Department of Health adopted rules and regulations for classification of waters in its jurisdiction. The Department classified the waters of Raritan Bay and tidal portions of the Raritan River in 1965, and in 1966 issued a proposed classification for the Arthur Kill.

In 1962, the Interstate Sanitation Commission issued requirements for secondary treatment of domestic and industrial wastes discharged to the Arthur Kill. These criteria called for at least an overall BOD reduction of 80%.

Both the States of New York and New Jersey have issued requirements for seasonal chlorination, effective in 1967, of all wastes discharged within the area of the Interstate Sanitation Commission.

In 1965, under the Federal Water Pollution Control Act, the Secretary of Health, Education, and Welfare convened a conference of pollution of the Hudson River and its tributaries, including Upper Bay. The conferees recommended secondary treatment and effective disinfection of all wastes discharged to these waters, and established a timetable calling for completion by January 1970.